Botanical Report

Huasna Well Sites and Access Roads
APN: 085-271-004; Lot 4
E/2SW/4, SW/4SE/4, Sec. 30, T12N, R33W
County of San Luis Obispo, CA

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Executive Summary

This report presents the results of a botanical analysis and specific rare plant search of the two well pads and access roads located in the mountains along the western side of the Huasna Valley, approximately 14 miles east-southeast of the City of Arroyo Grande and 0.5 miles west of the Huasna Townsite Road. The total area of the site is 160 Acres, but only approximately 5 Acres will be affected by the proposed project.

The project proposes to test three existing wells on two well pads for the purpose of determining the economic feasibility of redeveloping the existing oil field. Access to the site is provided by a private easement through the Mankins' Ranch over an existing dirt road located off Huasna Townsite Road. A botanical study of the well sites and access roads was conducted at the request of Excelaron LLC and the County of San Luis Obispo by Dr. V. L. Holland (Plant Ecologist), along with five student research assistants. The site was carefully examined for any evidence of sensitive habitats or species of concern known to occur in the general vicinity of the study site.

The natural vegetation on the well sites and along the access roads can be divided into three plant communities, which form a mosaic pattern over the hills and valleys of the site. Coast live oak woodland covers the majority of the areas along the road and around the well pads; however, there are also patches of Chaparral/Coastal scrub and Coastal valley grassland in open areas.

The access road will need to be widened in some narrow sections to provide for passage of drilling equipment, and any slope over 12% will require all-weather surfacing. In addition, a 13 1/2' tree limb clearance is required by CDF, which will result in trimming some of the oaks that line the roads. Grading of the existing roads, well pads, and the shipping point area will remove the existing vegetation.

The grading of the access roads and well pads will result in the loss of the native vegetation that has colonized and become established on the site. This includes the dense chaparral/coastal scrub and small coast live oaks on the cut slopes as well as the pads and roadsides. It will also result in the loss of an unknown number of *Arctostaphylos wellsii* (Wells's manzanita), the only special status plant species we found on the site. A qualified botanist should develop an on-site mitigation plan to replace the removed manzanitas. This could be included as part of a revegetation and erosion control plan for the disturbed sites following grading.

Trimming of oaks will be required along the road to allow oil field equipment passage. It is recommended that a qualified botanist supervise the process and be on site during the trimming. The cut and fill slopes required to widen the road and well pads present several potential impacts to the surrounding oak trees, which are discussed in this report. .

Introduction and Purpose

This report presents the results of a botanical analysis and specific rare plant search of two well pads and two access roads located on the Meridian Anticline, a northeast-southwest trending structure on the western side of the Huasna Valley on the Mankins' Ranch. The legal description of the site is APN: 085-271-004 and Case: PRE2006-00103 (William Divine). The oil field is located at Lot 4, E/2SW/4, SW/4SE/4, Sec. 30, T12N, R33 W, San Luis Obispo County, CA.

The project proposes to test three existing wells on two well pads for the purpose of determining the economic feasibility of redeveloping the existing oil field. The three shut-in wells that are proposed for production testing are located in an existing, abandoned oil field. Seven wells originally were drilled in the Meridian Anticline near the project site between 1928 and 1966, and five of those wells were completed. Production from the five completed wells was terminated in 1967, and the field was abandoned. The access roads to the well sites and tank battery still remain.

Access to the site is provided by a private easement through the Mankins' Ranch over an existing dirt road located off Huasna Townsite Road. The access road will need to be widened in some narrow sections to provide for passage of drilling equipment, and any slope over 12% will require all-weather surfacing. In addition, a 13 1/2' tree limb clearance is required by CDF, which will result in trimming some of the oaks that line the roads (Figures 6 to 9). Grading of the existing roads, well pads, and the shipping point area will remove the existing vegetation. Some of the existing oil field materials may also need to be removed from the site. Should the wells prove to be economically productive they will be brought to full-scale production.

A study of the well sites and access roads was conducted at the request of Excelaron LLC and the County of San Luis Obispo by Dr. V. L. Holland (Plant Ecologist), along with five student research assistants. The site was carefully examined for any evidence of sensitive habitats or species of concern known to occur in the general vicinity of the study site. The results of this botanical study are presented in this report.

Location & Physical Features

Location

The oil field is located in the mountains along the western side of the Huasna Valley, specifically on Lot 4, E/2SW/4, SW/4SE/4, Sec. 30, T12N, R33 W, San Luis Obispo County, CA. The site is approximately 14 miles east-southeast of the City of Arroyo Grande and 0.5 miles west of the Huasna Townsite Road. The total area of the site is 160 Acres, but only approximately 5 Acres will be affected by the proposed project.

Topography

The oil field is located in the rugged hills that characterize the mountain ranges in this area of San Luis Obispo County. The terrain consists mostly of ridges and steep hillsides cut by small canyons. The existing access roads wind up small canyons, steep hillsides, and along ridges to the two well pads, which are located near the top of a ridge at elevations of 1215 (Well pad 1) and 1260 feet (Well pad 2). These are shown on Figures 1, 2, 3, to 5. The roads traverse a mosaic on mostly dense coast live oak woodland with small open areas of grassland and native shrubs.

Land use

The areas on and around the oil field are designated by San Luis Obispo County as Rural Land and Open Space. The terrain is generally too steep and densely vegetated to provide significant forage for domestic animals; so the rangeland value is marginal at best. The vegetation along the access roads and around the well pads is mostly dense coast live oak woodland with areas of grassland and dense native shrubs that also form the oak woodland understory (Figures 3 to 10). The well pads are currently covered by a mosaic of seral vegetation consisting of small oaks, dense patches of native shrubs, and open areas of native and introduced grasses and forbs typical of disturbed sites (Figures 1 to 10). Figures 1 to 10 show the hilly topography, vegetation mosaic, and the locations of the roads and well sites.

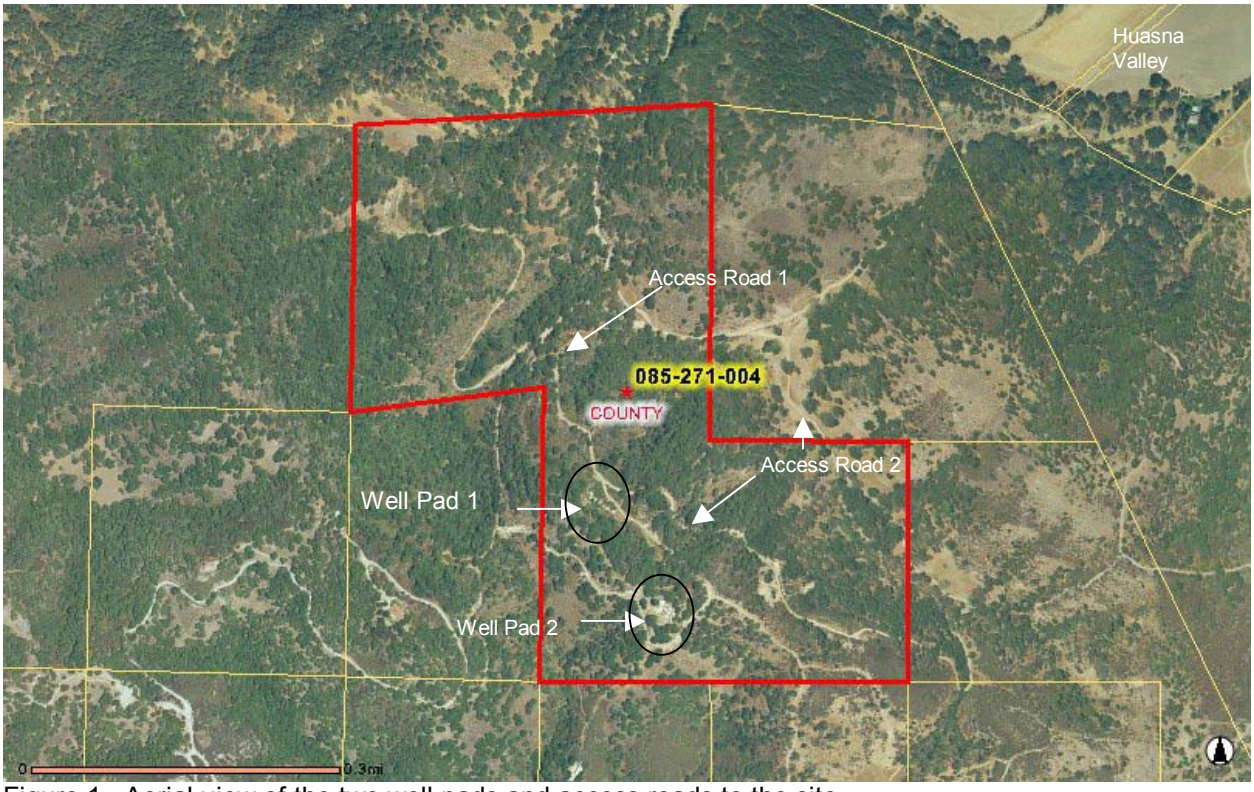

Figure 1. Aerial view of the two well pads and access roads to the site.

Figure 2. Aerial view with closer view of the two well pads and access roads to the site.

Floristic Inventory

Methods

Field surveys of the project site were carried out in April and May 2007 by Dr. V.L. Holland (Plant Ecologist) and five student research assistants. Consistent with most biological survey methodology, a stratified sampling method was used to examine both of the well pads and areas immediately around the pads including the potential path of new pipelines connecting the two. These sites were sampled along meandering transects shaped by variations in vegetation, landform, soil, and hydrology. Survey intensity increased as species diversity increased. Species presence and relative abundance were noted with the goal of recording as many species as possible and carefully searching for any rare plants. To accomplish this, the site was surveyed until no new species were found in transects. This method was also used along the entire length of the two access roads; however, only the vegetation immediately along the road and roadsides were examined. The areas away from the road will not be affected by the proposed project.

References used to verify identifications included relevant floras (Hickman 1993 and Hoover 1970) and herbarium specimens housed at the Hoover Herbarium, Cal Poly State University. Nomenclature follows that of the Jepson Manual (Hickman, 1993).

The results of this study present an accurate inventory of the plant species present on site; however, a few species may be present either in the soil seed reserve (especially annuals), as unidentifiable dried remains of last year's standing crop, or as relatively inconspicuous vegetative states. Only repeated surveys conducted during all seasons and even over a few years would provide an inventory nearing one-hundred percent completeness. However, the April and May 2007 studies provide a list of almost all the plants present within the proposed disturbances areas on the site and an accurate evaluation of the site for the presence of rare plant species. The timing of this survey corresponded to the flowering period of the rare plant species that are possible for the site.

Overview of Site Vegetation

Vegetation is shaped by the interactions among long-term climate, short-term weather events, local landforms, soils, hydrology, the physical tolerances of individual plant species, and land use history by animals, including humans. Plant associations are spatially and temporally dynamic. Definitions and boundaries are relative to the sharpness of the controlling environmental factors. Thus, plant communities are not always discrete but often transition into one another. On the subject site, the plant associations do have somewhat sharp boundaries although transition areas are also common (Figures 1 to11).

PLANT COMMUNITIES FOUND ON SITE

Plant communities are dynamic assemblages of plants that interact among themselves and their environment within a space-time boundary. Some of these communities are well defined and distinct while others are not. No two sites within a given community are exactly the same in environmental conditions, vegetation structure, or species composition. In addition, plant communities change through time, which important in understanding the vegetation on the site. The disturbed sites are undergoing succession and given time will become coast live oak woodland, the climax vegetation type in this area.

The natural vegetation on the well sites and along the access roads can be divided into three plant communities, which form a mosaic pattern over the hills and valleys of the site and integrate with each other. The plant communities include **(1) Coast live oak woodland; (2) Chaparral/Coastal scrub; (3); Coastal valley grassland.**

1. Coast Live Oak Woodland

Coast live oak woodland is one of the most characteristic vegetation types on the rolling and steep hillsides of California's central coast. This woodland is often composed of pure stands of *Quercus agrifolia* (coast live oak), but may also have other tree species as part of the overstory. On the hillsides around the Huasna well sites and access roads Coast live oak woodland is the climax vegetation type and

occupies the most mesic slopes and canyon areas. Because of the heterogeneity of the habitats on these hillsides and recent disturbances, the Coast live oak woodlands integrate with grassland and chaparral/coastal scrub on the subject site (Figures 3 to 11).

Coast live oak woodlands are characterized by a dense to sometimes open cover of coast live oaks that completely dominate the area. The understory varies from place to place, but for the most part the understory found on the project site has an understory of grassland herbs and scattered to dense native shrubs. Many of the shrubs and herbs are also common in the adjacent chaparral/coastal scrub and grassland areas. In drier, exposed sites, Coast live oaks form somewhat open woodlands with coastal valley grassland and scattered native shrubs under and among the trees.

The Huasna oil field site is surrounded by dense coast live oak woodland but patches of chaparral/coastal scrub are common on the pads and along road cuts and roadsides previously disturbed (Figures 3 to 10). It is likely that before the well pads and access roads were originally graded and cleared, coast live oak woodland covered most of the site. Since the grading, a diversity of native shrubs and native and introduced herbs has become established in these areas.

The understory of the oak woodland varies from place to place depending on the microenvironmental conditions. In the moist canyons and north facing slopes, the understory has a diversity of ferns and shade tolerant shrubs and herbs that require higher soil moisture. In drier areas, the understory shrubs are typical of the adjacent chaparral/coastal scrub and the grasses and forbs are those characteristic of the adjacent grasslands. Common understory species in the coast live oak woodland include the following:

Scientific name	**Common name**	**Family**	**Origin**
SHRUBS			
Arctostaphylos wellsii	Wells's manzanita	Ericaceae	California native
Baccharis pilularis	Coyote bush	Asteraceae	California native
Clematis ligusticifolia	Virgin's bower	Ranunculaceae	California native
Galium porrigens	Climbing bedstraw	Rubiaceae	California native
Heteromeles arbutifolia	Toyon	Rosaveae	California native
Holodiscus discolor	Ocean spray	Rosaceae	California native
Keckiella cordifolia	Climbing penstemon	Scrophulariaceae	California native
Mimulus aurantiacus	Bush monkey flower	Scrophulariaceae	California native
Phacelia ramosissima	Bush phacelia	Hydrophyllaceae	California native
Rhamnus californica	Coffeeberry	Rhamnaceae	California native
Ribes quercetorum	Foothill gooseberry	Grossulariaceae	California native
Continued			

Scientific name	Common name	Family	Origin
Ribes speciosum	Fuchsia-flowered gooseberry	Grossulariaceae	California native
Sambucus mexicana	Elderberry	Caprifoliaceae	California native
Solanum xanti	Purple nightshade	Solanaceae	California native
Symphoricarpos mollis	Snowberry	Caprifoliaceae	California native
Toxicodendron diversilobum	Poison-oak	Anacardiaceae	California native
HERBS			
Adiantum jordanii	Maidenhair fern	Pteridaceae	California native
Artemisia douglasiana	Mugwort	Asteraceae	California native
Avena barbata	Slender wild oats	Poaceae	Introduced
Bromus diandrus	Ripgut brome	Poaceae	Introduced
Carduus pycnocephalus	Italian thistle	Asteraceae	Introduced
Cerastium glomeratum	Mouse-ear chickweed	Caryophyllaceae	Introduced
Claytonia perfoliata	Miner's lettuce	Portulacaceae	California native
Dryopteris arguta	Wood fern	Dryopteridaceae	California native
Erodium botrys	Storkbill filaree	Geraniaceae	Introduced
Erodium cicutarium	Redstem filaree	Geraniaceae	Introduced
Galium aparine	Common bedstraw	Rubiaceae	Introduced
Geranium dissectum	Annual geranium	Geraniaceae	Introduced
Hordeum murinum	Foxtail barley	Poaceae	Introduced
Hypochaeris glabra	Smooth cat's ear	Asteraceae	Introduced
Leymus condensatus	Giant wild rye	Poaceae	California native
Lolium multiflorum	Ryegrass	Poaceae	Introduced
Pteridium aquilinum	Bracken fern	Dennstaedtiaceae	California native
Salvia spathacea	Hummingbird sage	Lamiaceae	California native
Sanicula crassicaulis	Sanicle	Apiaceae	California native
Sisymbrium officinale	Hedge mustard	Brassicaceae	Introduced
Sisymbrium officinale	Hedge mustard	Brassicaceae	Introduced
Solanum douglasii	Black nightshade	Solanaceae	California native
Stachys bullata	Hedge-nettle	Lamiaceae	California native
Stellaria media	Chickweed	Caryophyllaceae	Introduced

2. Chaparral/Coastal Scrub Community

The Chaparral and Coastal Scrub communities on the site integrate and form a mix of the two communities. Therefore, we decided to discuss them together in this report. This shrubland is a mixture of evergreen, sclerophyllous shrubs characteristic of chaparral and of comparatively soft-stemmed shrubs that undergo significant dieback during the summer drought typical of the coastal scrub. The former is considered “hard chaparral" or "true chaparral" while the coastal scrub is sometimes referred to as "soft chaparral".

Both the density and the composition of the shrub cover vary from site to site as does the herbaceous understory. In some places, the shrubs form a dense, almost impenetrable woody plant cover with a sparse understory. In other areas the shrubby overstory is more open and has a well developed herbaceous understory.

The chaparral/coastal scrub occur in several patches on the hillsides, well pads, road cuts, road sides, and cut slopes around the well pads (Figures 3 to 9). It also integrates with the Coast live oak woodland and the common shrubs form part of the woodland's understory. Patches of shrubs also form a mosaic with the grasslands on the well pads and other open areas on the site.

As discussed previously, the relative species composition of the chaparral/coastal scrub varies from place to place on the site; however, in general the common species are listed below.

Scientific name	Common name	Family	Origin
SHRUBS			
Adenostoma fasciculatum	Chamise	Rosaceae	California native
Arctostaphylos wellsii	Wells's manzanita	Ericaceae	California native
Arctostaphylos pilosula	Santa Margarita manzanita	Ericaceae	California native
Artemisia californica	California sagebrush	Asteraceae	California native
Baccharis pilularis	Coyote bush	Asteraceae	California native
Ceanothus cuneatus	Buckbrush	Rhamnaceae	California native
Cercocarpus betuloides	Mountain mahogany	Rosaceae	California native
Clematis ligusticifolia	Virgin's bower	Ranunculaceae	California native
Galium porrigens	Climbing bedstraw	Rubiaceae	California native
Hazardia squarrosa	Saw-toothed golden bush		
Keckiella cordifolia	Climbing penstemon	Scrophulariaceae	California native
Lotus scoparius	Deerweed	Fabaceae	California native
Lupinus albifrons	Bush lupine	Fabaceae	California native
Mimulus aurantiacus	Bush monkey flower		
Rhamnus californica	Coffeeberry	Rhamnaceae	California native
Salvia leucophylla	Purple sage	Lamiaceae	California native
Salvia mellifera	Black sage	Lamiaceae	California native
Solanum xanti	Purple nightshade	Solanaceae	California native
Toxicodendron diversilobum	Poison-oak	Anacardiaceae	California native
HERBS			
Acourtia microcephala	Sacapellote	Asteraceae	California native
Avena barbata	Slender wild oats	Poaceae	Introduced
Bromus catharticus	Rescue grass	Poaceae	Introduced

Scientific name	Common name	Family	Origin
Bromus diandrus	Ripgut brome	Poaceae	Introduced
Continued			
Bromus hordeaceus	Soft chess brome	Poaceae	Introduced
Calystegia macrostegia	Wild morning glory	Convolvulaceae	California native
Carduus pycnocephalus	Italian thistle	Asteraceae	Introduced
Elymus glaucus	Blue wild rye	Poaceae	California native
Epilobium canum		Onagraceae	California native
Gnaphalium californicum	Everlasting	Asteraceae	California native
Gnaphalium canescens	Everlasting	Asteraceae	California native
Gnaphalium luteoalbum	Cudweed	Asteraceae	Introduced
Gnaphalium purpureum	Everlasting	Asteraceae	California native
Lessingia filaginifolia var. *filaginifolia*	California-aster	Asteraceae	California native
Leymus condensatus	Giant wild rye	Poaceae	California native
Marah fabaceus	Wild cucumber vine	Cucurbitaceae	California native
Paeonia californica	California peony	Paeoniaceae	California native
Plantago erecta	Plantain	Plantaginaceae	California native
Sisymbrium officinale	Hedge mustard	Brassicaceae	Introduced
Stephanomeria sp.	Rock-lettuce	Asteraceae	California native
Verbena lasiostachys	Vervain	Verbenaceae	California native
Vicia sativa	Deer vetch	Fabaceae	Introduced
Vulpia myuros	Rattail fescue	Poaceae	Introduced

3. Coastal Valley Grasslands

Southern coastal grasslands are areas in which the dominant plants are various species of native and introduced grasses and forbs. Often there are numerous species of herbaceous plants and sometimes scattered shrubs. The grasses that dominate grassland areas may be annuals, perennials or a mixture of the two depending on location. Because the ruderal plants on the well pads and along the roads are also found in the grassland, we have included these as part of the grassland discussion.

In the areas around the Huasna well sites and along the access roads, grasslands occur in the valleys and rolling hillsides. They integrate with coast live oak woodlands on mesic slopes and with chaparral/coastal scrub on xeric, steep, rocky areas and disturbed sites. Many of the grassland species occur as understory species in the other communities. Patches of grassland are common in open areas along the roads and on the well site pads, where they have colonized and become established after the previous oil field disturbances (Figures 3, 4, 5, 8, and 11).

The stands of perennial, native bunch grasses, which dominated the grassland prior to Spanish settlement, have gradually been reduced locally and only a few were

found in the areas of disturbance such as a cleared, flattened well pads and roadsides. As a result, ruderal, introduced annuals dominate the grasslands in these disturbed areas. Native forbs and grasses are present but are not dominant. At the lower elevations, the access roads traverse patches of typical Coastal valley grassland with scattered oaks and shrubs (Figure 11). The composition of this grassland is similar to that found on the more disturbed sites, but many of the more invasive, weedy species are not as common.

Some of the common plants found in these grasslands and on the well sites and along the roads are listed below.

Scientific name	**Common name**	**Family**	**Origin**
Amsinckia menziesii	Fiddleneck	Boraginaceae	California native
Anagallis arvensis	Scarlet pimpernel	Primulaceae	Introduced
Avena barbata	Slender wild oats	Poaceae	Introduced
Avena fatua	Common wild oats	Poaceae	Introduced
Bromus diandrus	Ripgut brome	Poaceae	Introduced
Bromus hordeaceus	Soft chess brome	Poaceae	Introduced
Bromus madritensis ssp. rubens	Red brome	Poaceae	Introduced
Capsella bursa-pastoris	Shepherd's purse	Brassicaceae	Introduced
Carduus pycnocephalus	Italian thistle	Asteraceae	Introduced
Centaurea melitensis	Centaurea	Asteraceae	Introduced
Erodium botrys	Storkbill filaree	Geraniaceae	Introduced
Erodium cicutarium	Redstem filaree	Geraniaceae	Introduced
Filago gallica	Herba impia	Asteraceae	Introduced
Hirschfeldia incana	Perennial mustard	Brassicaceae	Introduced
Hordeum murinum	Foxtail barley	Poaceae	Introduced
Lamarckia aurea	Goldentop grass	Poacaceae	Introduced
Lolium multiflorum	Ryegrass	Poaceae	Introduced
Lupinus nanus	Sky lupine	Fabaceae	California native
Medicago polymorpha	Bur-clover	Fabaceae	Introduced
Rumex acetosella	Dock	Polygonaceae	Introduced
Silene gallica	Windmill pink	Caryophyllaceae	Introduced
Sisymbrium officinale	Hedge mustard	Brassicaceae	Introduced
Sonchus asper	Prickly sow-thistle	Asteraceae	Introduced
Sonchus oleraceus	Common sow-thistle	Asteraceae	Introduced
Stachys bullata	Hedge-nettle	Lamiaceae	California native
Thysanocarpus laciniatus	Fringe pod	Brassicaceae	California native
Verbena lasiostachys	Vervain	Verbenaceae	California native
Vicia sativa	Deer vetch	Fabaceae	Introduced
Vulpia myuros	Rattail fescue	Poaceae	Introduced

Figure 3. View of Well Pad 1 showing old tanks (upper left) and well site (upper right). The coast live oak woodland surrounds the pad, but the level pad has a mixture of small oaks, native shrubs, and native and introduced grasses and forbs.

Figure 4. View of tank and surrounding cut slope which is now densely vegetation with native shrubs in places.

Figure 5. Well Pad 2 showing the well developed Wells's manzanitas on and around the pad and surrounding coast live oak woodland.

Figure 6. Road connecting Well Pad 1 and 2 showing that native shrubs have colonized the roadsides and tall oaks still line parts of the road.

Figure 7. View of Access Road 1 from just below Well Pad 1 showing that most of the road is lined by dense coast live oak woodland with a few open areas.

Figure 8. Parts of Access Road 1 have open areas vegetated by grassland and native shrubs.

Figure 9. View of Access Road 2 near the base of Well Pad 1. It is line mostly by coast live oak woodland and open areas of native shrubs in the upper elevations.

Figure 10. Most of the previously graded road sides and road cuts are now vegetated with various native shrubs.

Figure 11. At lower elevations, Access Road 2 traverses areas of scattered oaks with open grassland and scattered native shrubs. This is a view of the shipping point area.

Special–Status Plant Species

To determine what rare plant species could potentially be present on the Huasna oil field site, we conducted a careful search for the rare plants known to occur within the encompassing 7.5 minute quadrangle as well as in the general vicinity of the study site. To generate this list the most recent 2007 edition of the California Department of Fish and Game Natural Diversity Data Base: Special Vascular Plants, Bryophytes, and Lichen List *(CNDDB)* and the most recent edition of the California Native Plant Society (CNPS) *Inventory of Rare and Endangered Vascular Plants of California* database, both of which are accessible through the internet (http://www.dfg.ca.gov/whdab/html/cnddb.html and www.cnps.org), were referenced.

This search revealed 34 special status plant species with known or probable occurrence in the general vicinity of the site. These species, which are listed on Table 1 along with their rarity status, are sufficiently rare to have been officially accorded special conservation status by CNPS, by California Fish and Game, and/or by the U. S. Fish and Wildlife Service. Table 2 lists the characteristics of these rare plants such as elevation range, flowering period, habit, etc.

After an intensive search of the property, I found one rare plant present, *Arctostaphylos wellsii* (Wells's manzanita). Its current status is described briefly below. I did not find any other rare plants on the site and I am confident no others are present within the proposed disturbance areas along the roads and well pads.

Arctostaphylos wellsii **(Wells's manzanita)** is currently found from the San Luis Range (upper Coon Creek) to upper Arroyo Grande and Nipomo. It is most abundant on sandstone hills between San Luis Valley and the ocean. Although Wells's manzanita has a geographically restricted range, it is typical for this species to form well-developed stands of chaparral where it is the dominant shrub. Wells's manzanita is threatened by development over much of its range, and some stands have been extirpated in recent years. It is quite common around the well pads especially well pad 2 (Figure 5).

It should be noted that this species may be combined with *Arctostaphylos pilosula* (Santa Margarita manzanita) when taxonomic studies of these two species are complete. As a result, I have listed both species in the plant list for the site. Both species currently have the same rarity status so there should be not changes in the recommendations presented here.

Table 1: List of rare plants with known or potential occurrences near the Huasna oil field site, along with rarity status.

Scientific Name	Common Name	CNPS list	State Rank	Global Rank	State List	Fed List
Agrostis hooveri	Hoover's bent grass	List 1B	S2.2	G3		
Arctostaphylos luciana	Santa Lucia manzanita	List 1B	S2.2	G2		
Arctostaphylos pechoensis	Pecho manzanita	List 1B	S2.2	G2		
Arctostaphylos pilosula	Santa Margarita manzanita	List 1B	S2.2	G2		
Arctostaphylos rudis	sand mesa manzanita	List 1B	S2.2	G2		
Arctostaphylos wellsii	Wells' manzanita	List 1B	S2.1?	G2		
Astragalus didymocarpus var. *milesianus*	Miles' milk-vetch	List 1B	S2.2	G5T2		
Calochortus obispoensis	San Luis mariposa lily	List 1B	S2.1	G2		
Calochortus palmeri var. *palmeri*	Palmer's mariposa lily	List 1B.2	S2.1	G2T2		
Calochortus simulans	San Luis Obispo mariposa lily	List 1B	S2.3	G2		
Calycadenia villosa	dwarf calycadenia	List 1B	S2.1	G2		
Camissonia hardhamiae	Hardham's evening-primrose	List 1B	S1.2	G1Q		
Castilleja densiflora ssp. *obispoensis*	Obispo Indian paintbrush	List 1B	S2.2	G5T2		
Caulanthus coulteri var. *lemmonii*	Lemmon's jewelflower	List 1B	S2.2	G4T2		
Chlorogalum pomeridianum var. *minus*	dwarf soaproot	List 1B	S1.2	G5T1		
Chlorogalum purpureum var. *purpureum*	purple amole	List 1B	S1.1	G1T1		FT
Chorizanthe rectispina	straight-awned spineflower	List 1B	S1.2	G1		
Clarkia speciosa ssp. *immaculata*	Pismo clarkia	List 1B	S1.1	G4T1	CR	FE
Deinandra halliana	Hall's tarplant	List 1B	S1.1	G1		
Deinandra increscens ssp. *foliosa*	leafy tarplant	List 1B	S2.2	G4G5T2		
Delphinium umbraculorum	umbrella larkspur	List 1B	S2S3.3	G2G3		
Eriastrum luteum	yellow-flowered eriastrum	List 1B	S2.2	G2		
Fritillaria ojaiensis	Ojai fritillary	List 1B	S1.2	G1		
Lepidium jaredii ssp. *jaredii*	Jared's pepper-grass	List 1B	S1.2	G1T1		
Lupinus ludovicianus	San Luis Obispo County lupine	List 1B	S2.2	G2		
Malacothamnus aboriginum	Indian Valley bush mallow	List 1B	S3.2	G3		
Malacothamnus davidsonii	Davidson's bush mallow	List 1B	S1.1	G1		
Malacothamnus palmeri var. *palmeri*	Santa Lucia bush mallow	List 1B	S2.2	G3T2Q		
Malacothrix saxatilis var. *arachnoidea*	Carmel Valley malacothrix	List 1B	S2.2	G5T2		
Micropus amphibolus	Mt. Diablo cottonweed	List 1B	S3.2?	G3		
Monardella palmeri	Palmer's monardella	List 1B	S2.2	G2		
Navarretia nigelliformis ssp. *radians*	shining navarretia	List 1B	S1.1	G4T1		
Scrophularia atrata	black-flowered figwort	List 1B	S2.2	G2		
Senecio aphanactis	rayless ragwort	List 2	S1.2	G3?		

California Native Plant Society	California Dept of Fish & Game	U. S. Dept of Fish and Wildlife
List 1—Plants of Highest Priority (2 sublists): **1A**—Plants Presumed Extinct in California **1B**—Plants Rare and Endangered in California and Elsewhere **List 2**—Plants Rare or Endangered in California, but More Common Elsewhere **List 3**—Plants about which More Information is Needed **List 4**—Plants of Limited Distribution (A Watch List) **R (Rarity)** 1. Rare but found in sufficient numbers and distributed widely enough that the potential for extinction or extirpation is low at this time 2. Distributed in a limited number of occurrences, occasionally more if each occurrence is small 3. Distributed in one to several highly restricted occurrences, or present in such small numbers that it is seldom reported **E (Endangerment)** 1. Not endangered 2. Endangered in a portion of its range 3. Endangered throughout its range **D (Distribution)** 1. More or less widespread outside California 2. Rare outside California 3. Endemic to California	**Endangered Species (CE)** Plant taxa whose prospects for survival are in immediate jeopardy from one or more causes **Threatened Species (CT)** Plant taxa not presently threatened with extinction, but likely to become endangered within the foreseeable future in the absence of special protection and management efforts **Rare Species (CR)** Plant taxa not presently threatened with extinction, but occurring in such small numbers throughout its range that they may become endangered if habitat conditions worsen **STATE RANKIING** **S1 =** Less than 6 EOs or less than 1,000 individuals or less than 2,000 acres **S2 =** 6-20 EOs or 1,000–3,000 individuals or 2,000–10,000 acres **S3 =** 21-100 EOs or 3,000-10,000 individuals or 10,000-50,000 acres **S4 =** Apparently secure in California – No threat rank **S5 =** Demonstrably secure in California – No threat rank **Number following S ranks** **1 – Very threatened; 2 – threatened; 3 – no current threats**	**Endangered Species (FE)** Taxa in danger of extinction throughout all or a significant portion of their range **Threatened Species (FT)** Taxa likely to become endangered within the foreseeable future throughout all or a significant portion of their range **Candidate Species (C)** Taxa for which the Service has on file enough substantial information on biological vulnerability and threat(s) to support proposals to list them as endangered or threatened species, but such action has been delayed by other listing activity

GX **Presumed Extinct—**Believed to be extinct throughout its range. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.

GH **Possibly Extinct—**Known from only historical occurrences, but may nevertheless still is extant; further searching needed.

G1 **Critically Imperiled—**Critically imperiled globally because of extreme rarity or because of some factor(s) making it especially vulnerable to extinction. Typically 5 or fewer occurrences or very few remaining individuals (<1,000) or acres (<2,000) or linear miles (<10).

G2 **Imperiled—**Imperiled globally because of rarity or because of some factor(s) making it very vulnerable to extinction or elimination. Typically 6 to 20 occurrences or few remaining individuals (1,000 to 3,000) or acres (2,000 to 10,000) or linear miles (10 to 50).

G3 **Vulnerable—**Vulnerable globally either because very rare and local throughout its range, found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extinction or elimination. Typically 21 to 100 occurrences or between 3,000 and 10,000 individuals.

G4 **Apparently Secure—**Uncommon but not rare (although it may be rare in parts of its range, particularly on the periphery), and usually widespread. Apparently not vulnerable in most of its range, but possibly cause for long-term concern. Typically more than 100 occurrences and more than 10,000 individuals.

G5 **Secure—**Common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery). Not vulnerable in most of its range. Typically with considerably more than 100 occurrences and more than 10,000 individuals.

T# **Infraspecific Taxon (trinomial)—**The status of infraspecific taxa (subspecies or varieties) are indicated by a "T-rank" following the species' global rank. Rules for assigning T-ranks follow the same principles outlined above. For example, the global rank of a critically imperiled subspecies of an otherwise widespread and common species would be G5T1.

Table 2: List of rare plants with known or potential occurrences near the Huasna oil field site along with life form, flowering periods, and elevation ranges.

Scientific Name	Common Name	Life form	Flower	Elevation Range (m)
Agrostis hooveri	Hoover's bent grass	perennial stoloniferous herb	Apr-Jul	60 - 600
Arctostaphylos luciana	Santa Lucia manzanita	perennial evergreen shrub	Feb-Mar	350 - 850
Arctostaphylos pechoensis	Pecho manzanita	perennial evergreen shrub	Nov-Mar	125 - 850
Arctostaphylos pilosula	Santa Margarita manzanita	perennial evergreen shrub	Dec-Mar	170 - 1100
Arctostaphylos rudis	sand mesa manzanita	perennial evergreen shrub	Nov-Feb	25 - 230
Arctostaphylos wellsii	Wells' manzanita	perennial evergreen shrub	Dec-May	30 - 1400
Astragalus didymocarpus var. *milesianus*	Miles' milk-vetch	annual herb	Mar-Jun	20 - 90
Calochortus obispoensis	San Luis mariposa lily	perennial bulbiferous herb	May-Jul	75 - 730
Calochortus palmeri var. *palmeri*	Palmer's mariposa lily	perennial bulbiferous herb	May-Jul	1000 - 2390
Calochortus simulans	San Luis Obispo mariposa lily	perennial bulbiferous herb	Apr-May	395 - 1100
Calycadenia villosa	dwarf calycadenia	annual herb	May-Oct	240 - 1350
Camissonia hardhamiae	Hardham's evening-primrose	annual herb	Apr-May	140 -610
Castilleja densiflora ssp. *obispoensis*	Obispo Indian paintbrush	annual herb	Mar-May	10 - 400
Caulanthus coulteri var. *lemmonii*	Lemmon's jewelflower	annual herb	Mar-May	80 - 1220
Chlorogalum pomeridianum var. *minus*	dwarf soaproot	perennial bulbiferous herb	May-Aug	305 - 1000
Chlorogalum purpureum var. *purpureum*	purple amole	perennial bulbiferous herb	Apr-Jun	205 - 350
Chorizanthe rectispina	straight-awned spineflower	annual herb	Apr-Jul	85 - 1035
Clarkia speciosa ssp. *immaculata*	Pismo clarkia	annual herb	May-Jul	25 - 185
Deinandra halliana	Hall's tarplant	annual herb	Apr-May	300 - 950
Deinandra increscens ssp. *foliosa*	leafy tarplant	annual herb	Jun-Sep	300 - 500
Delphinium umbraculorum	umbrella larkspur	perennial herb	Apr-Jun	400 - 1600
Eriastrum luteum	yellow-flowered eriastrum	annual herb	May-Jun	290 - 1000
Fritillaria ojaiensis	Ojai fritillary	perennial bulbiferous herb	Mar-May	300 - 670
Lepidium jaredii ssp. *jaredii*	Jared's pepper-grass	annual herb	Mar-May	335 - 1005
Lupinus ludovicianus	San Luis Obispo County lupine	perennial herb	Apr-Jul	50 - 525
Malacothamnus aboriginum	Indian Valley bush mallow	perennial deciduous shrub	Apr-Oct	150 - 1700
Malacothamnus davidsonii	Davidson's bush mallow	perennial deciduous shrub	Jun-Jan	185 - 855
Malacothamnus palmeri var. *palmeri*	Santa Lucia bush mallow	perennial deciduous shrub	May-Jul	60 - 360
Malacothrix saxatilis var. *arachnoidea*	Carmel Valley malacothrix	perennial rhizomatous herb	(Mar)Jun-Dec	25 - 335
Micropus amphibolus	Mt. Diablo cottonweed	annual herb	Mar-May	45 - 825
Monardella palmeri	Palmer's monardella	perennial rhizomatous herb	Jun-Aug	200 - 800
Navarretia nigelliformis ssp. *radians*	shining navarretia	annual herb	May-Jul	90 - 1000
Scrophularia atrata	black-flowered figwort	perennial herb	Mar-Jul	10 - 500
Senecio aphanactis	rayless ragwort	annual herb	Jan-Apr	15 - 800

Impacts and Mitigations

Grading of the access roads and well pads will result in the loss of the native vegetation that has colonized and become established on these sites. This includes the dense patches of chaparral/coastal scrub and small coast live oaks on the cut slopes, well pads and roadsides. It will also result in the loss of an unknown number of Wells's manzanitas (a special status plant species).

In addition, there are some low hanging coast live oak branches that will require trimming to allow tall trucks and equipment to traverse the road. It is recommended that a qualified botanist supervise the process and be on site during the trimming. It appears that the road work can be conducted without removing oak trees; however, if oak trees are removed, a mitigation plan will need to be developed to replace them on the site.

Cut and fill slopes will be required to widen the road and well pads and will result in several potential impacts to the surrounding oak trees. These impacts may include filling around trees, ripping and exposing root systems, changes in drainage patterns, etc. The San Luis Obispo County website has guidelines for development around coast live oaks, including proper trimming methods and grading procedures, which should be followed to protect the impacted trees (http://www.sloplanning.org/oaks.html).

Grading and widening the well pads, and to a lesser degree the roads, will result in the loss of an unknown number of Wells's manzanitas. A qualified botanist should develop a mitigation plan to replace the removed manzanitas on the site. This could be included as part of a revegetation and erosion control plan for the disturbed sites following grading.

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Appendix 1: Species List

Plant species identified during the field survey of the Huasna well sites and access roads, San Luis Obispo County, CA

Scientific name	Common name	Family	Origin
TREES			
Quercus agrifolia	Coast live oak	Fagaceae	California native
Quercus douglasii	Blue oak	Fagaceae	California native
Quercus lobata	Valley oak	Fagaceae	California native
SHRUBS			
Adenostoma fasciculatum	Chamise	Rosaceae	California native
Arctostaphylos wellsii	Wells's manzanita	Ericaceae	California native
Artemisia californica	California sagebrush	Asteraceae	California native
Baccharis pilularis	Coyote bush	Asteraceae	California native
Ceanothus cuneatus	Buckbrush	Rhamnaceae	California native
Cercocarpus betuloides	Mountain mahogany	Rosaceae	California native
Clematis ligusticifolia	Virgin's bower	Ranunculaceae	California native
Galium porrigens	Climbing bedstraw	Rubiaceae	California native
Hazardia squarrosa	Saw-toothed golden bush	Asteraceae	California native
Heteromeles arbutifolia	Toyon	Rosaveae	California native
Holodiscus discolor	Ocean spray	Rosaceae	California native
Keckiella cordifolia	Climbing penstemon	Scrophulariaceae	California native
Lotus scoparius	Deerweed	Fabaceae	California native
Lupinus albifrons	Bush lupine	Fabaceae	California native
Malosma laurina	Laurel sumac	Anacardiaceae	California native
Marrubium vulgare	Horehound	Lamiaceae	Introduced
Mimulus aurantiacus	Bush monkey flower		
Phacelia ramosissima	Bush phacelia	Hydrophyllaceae	California native
Rhamnus californica	Coffeeberry	Rhamnaceae	California native
Ribes quercetorum	Foothill gooseberry	Grossulariaceae	California native
Ribes speciosum	Fuchsia-flowered gooseberry	Grossulariaceae	California native
Rosa californica	Wild rose	Rosaceae	California native
Rubus ursinus	Wild blackberry	Rosaceae	California native
Salvia leucophylla	Purple sage	Lamiaceae	California native
Salvia mellifera	Black sage	Lamiaceae	California native
Sambucus mexicana	Elderberry	Caprifoliaceae	California native
Solanum xanti	Purple nightshade	Solanaceae	California native
Symphoricarpos mollis	Snowberry	Caprifoliaceae	California native
Toxicodendron diversilobum	Poison-oak	Anacardiaceae	California native

Scientific name	Common name	Family	Origin
HERBS			
Acourtia microcephala	Sacapellote	Asteraceae	California native
Adiantum jordanii	Maidenhair fern	Pteridaceae	California native
Ambrosia psilostachya	Western ragweed	Asteraceae	California native
Amsinckia menziesii	Fiddleneck	Boraginaceae	California native
Anagallis arvensis	Scarlet pimpernel	Primulaceae	Introduced
Artemisia douglasiana	Mugwort	Asteraceae	California native
Avena barbata	Slender wild oats	Poaceae	Introduced
Avena fatua	Common wild oats	Poaceae	Introduced
Brassica nigra	Black mustard	Brassicaceae	Introduced
Bromus catharticus	Rescue grass	Poaceae	Introduced
Bromus diandrus	Ripgut brome	Poaceae	Introduced
Bromus hordeaceus	Soft chess brome	Poaceae	Introduced
Bromus madritensis ssp. madritensis	Spanish brome	Poaceae	Introduced
Bromus madritensis ssp. rubens	Red brome	Poaceae	Introduced
Calystegia macrostegia	Wild morning glory	Convolvulaceae	California native
Capsella bursa-pastoris	Shepherd's purse	Brassicaceae	Introduced
Carduus pycnocephalus	Italian thistle	Asteraceae	Introduced
Centaurea melitensis	Centaurea	Asteraceae	Introduced
Cerastium glomeratum	Mouse-ear chickweed	Caryophyllaceae	Introduced
Chenopodium californicum	Goosefoot	Chenopodiaceae	California native
Chlorogalum pomeridianum	Soap plant	Liliaceae	California native
Cirsium vulgare	Bull thistle	Asteraceae	Introduced
Claytonia perfoliata	Miner's lettuce	Portulacaceae	California native
Conyza canadensis	Horseweed	Asteraceae	Introduced
Dichelostemma capitatum	Blue dicks	Liliaceae	California native
Dryopteris arguta	Wood fern	Dryopteridaceae	California native
Elymus glaucus	Blue wild rye	Poaceae	California native
Epilobium canum		Onagraceae	California native
Epilobium sp.	Willow-herb	Onagraceae	California native
Erodium botrys	Storkbill filaree	Geraniaceae	Introduced
Erodium cicutarium	Redstem filaree	Geraniaceae	Introduced
Eschscholzia californica	California poppy	Papaveraceae	California native
Filago gallica	Herba impia	Asteraceae	Introduced
Foenculum vulgare	Sweet fennel	Asteraceae	Introduced
Galium aparine	Common bedstraw	Rubiaceae	Introduced
Geranium dissectum	Annual geranium	Geraniaceae	Introduced
Gnaphalium californicum	Everlasting	Asteraceae	California native
Gnaphalium canescens	Everlasting	Asteraceae	California native
Gnaphalium luteoalbum	Cudweed	Asteraceae	Introduced
Gnaphalium purpureum	Everlasting	Asteraceae	California native
Hirschfeldia incana	Perennial mustard	Brassicaceae	Introduced

Scientific name	Common name	Family	Origin
Hordeum murinum	Foxtail barley	Poaceae	Introduced
Hypochaeris glabra	Smooth cat's ear	Asteraceae	Introduced
Lamarckia aurea	Goldentop grass	Poacaceae	Introduced
Lessingia filaginifolia var. filaginifolia	California-aster	Asteraceae	California native
Leymus condensatus	Giant wild rye	Poaceae	California native
Lolium multiflorum	Ryegrass	Poaceae	Introduced
Lupinus nanus	Sky lupine	Fabaceae	California native
Malva nicaeensis	Mallow	Malvaceae	Introduced
Malva parviflora	Mallow	Malvaceae	Introduced
Marah fabaceus	Wild cucumber vine	Cucurbitaceae	California native
Medicago polymorpha	Bur-clover	Fabaceae	Introduced
Melica californica	Melic grass	Poaceae	California native
Melica imperfecta	Melic grass	Poaceae	California native
Melilotus indicus	Yellow sweet clover	Fabaceae	Introduced
Oxalis albicans ssp. pilosa	Sorrel	Oxalidaceae	California native
Paeonia californica	California peony	Paeoniaceae	California native
Pentagramma triangularis	Goldback fern	Pteridaceae	California native
Plagiobothrys sp.	Popcorn flower	Boraginaceae	California native
Plantago erecta	Plantain	Plantaginaceae	California native
Pteridium aquilinum	Bracken fern	Dennstaedtiaceae	California native
Pterostegia drymarioides	Notchleaf	Polygonaceae	California native
Ranunculus californicus	Buttercup	Ranunculaceae	California native
Rumex acetosella	Dock	Polygonaceae	Introduced
Salvia spathacea	Hummingbird sage	Lamiaceae	California native
Sanicula crassicaulis	Sanicle	Apiaceae	California native
Selaginella bigelovii	Spike-moss	Selaginellaceae	California native
Silene gallica	Windmill pink	Caryophyllaceae	Introduced
Silybum marianum	Milk-thistle	Asteraceae	Introduced
Sisymbrium officinale	Hedge mustard	Brassicaceae	Introduced
Sisyrinchium bellum	Blue-eyed grass	Iridacaeae	California native
Solanum douglasii	Black nightshade	Solanaceae	California native
Sonchus asper	Prickly sow-thistle	Asteraceae	Introduced
Sonchus oleraceus	Common sow-thistle	Asteraceae	Introduced
Stachys bullata	Hedge-nettle	Lamiaceae	California native
Stellaria media	Chickweed	Caryophyllaceae	Introduced
Stephanomeria sp.	Rock-lettuce	Asteraceae	California native
Thysanocarpus laciniatus	Fringe pod	Brassicaceae	California native
Torilis nodosus	Knotted hedge-parsley	Apiaceae	Introduced
Trifolium sp.	Annual clover	Fabaceae	California native
Verbena lasiostachys	Vervain	Verbenaceae	California native
Vicia sativa	Deer vetch	Fabaceae	Introduced
Vulpia myuros	Rattail fescue	Poaceae	Introduced